



ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: RB211-535E4B BYPASS RATIO: 4.1
 UNIQUE ID NUMBER: 5RR039 PRESSURE RATIO (π_{c0}): 27.9
 COMBUSTOR: Phase5
 ENGINE TYPE: MTF RATED THRUST (F_{00}) (kN): 191.7

REGULATORY DATA

| CHARACTERISTIC VALUE: | HC | CO | NO _x | SMOKE NUMBER |
|--|-----|------|-----------------|--------------|
| D _p /F ₀₀ (g/kN) or SN | 0.4 | 36.5 | 53.8 | 9.4 |
| AS % OF ORIGINAL LIMIT | 2.2 | 30.9 | 56.1 | 47.5 |
| AS % OF CAEP/2 LIMIT (NO _x) | | | 70.2 | |
| AS % OF CAEP/4 LIMIT (NO _x) | | | 84.5 | |
| AS % OF CAEP/6 LIMIT (NO _x) | | | 96.0 | |
| AS % OF CAEP/8 LIMIT (NO _x) | | | 114.1 | |

DATA STATUS

- PRE-REGULATION
 x CERTIFICATION
 - REVISED (SEE REMARKS)

TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES
 x DEDICATED ENGINES TO PRODUCTION STANDARD
 - OTHER (SEE REMARKS)

EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE
 (ANNEX 16 VOLUME II)

CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)
 x OUT OF PRODUCTION (DATE: -)
 - OUT OF SERVICE (DATE: -)

MEASURED DATA

| MODE | POWER SETTING (%F ₀₀) | TIME (minutes) | FUEL FLOW (kg/s) | EMISSIONS INDICES (g/kg) | | | SMOKE NUMBER |
|--|-----------------------------------|----------------|------------------|--------------------------|-------------|-----------------|--------------|
| | | | | HC | CO | NO _x | |
| TAKE-OFF | 100 | 0.7 | 2.070 | 0.07 | 0.33 | 25.88 | 7.3 |
| CLIMB OUT | 85 | 2.2 | 1.640 | 0.00 | 0.26 | 19.30 | 6.8 |
| APPROACH | 30 | 4.0 | 0.550 | 0.05 | 2.43 | 8.65 | 0.6 |
| IDLE | 7 | 26.0 | 0.190 | 0.14 | 18.24 | 4.58 | 0.5 |
| LTO TOTAL FUEL (kg) or EMISSIONS (g) | | | 732 | 54 | 5812 | 8927 | - |
| NUMBER OF ENGINES | | | | 1 | 1 | 1 | 1 |
| NUMBER OF TESTS | | | | 3 | 3 | 3 | 3 |
| AVERAGE D _p /F ₀₀ (g/kN) or AVERAGE SN (MAX) | | | | 0.3 | 29.7 | 46.4 | 7.3 |
| SIGMA (D _p /F ₀₀ in g/kN, or SN) | | | | | | | |
| RANGE (D _p /F ₀₀ in g/kN, or SN) | | | | 0.16-0.54 | 29.45-29.91 | 44.9-48 | 6.9-7.9 |

ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS
 STAGE BLEED 0 (% CORE FLOW) AT - POWER SETTINGS

ATMOSPHERIC CONDITIONS

| | |
|----------------------|---------------|
| BAROMETER (kPa) | 100.7-101.2 |
| TEMPERATURE (K) | 281-287 |
| ABS HUMIDITY (kg/kg) | 0.0058-0.0064 |

FUEL

| | |
|----------|-------|
| SPEC | AVTUR |
| H/C | 1.93 |
| AROM (%) | 17.6 |

MANUFACTURER: Rolls-Royce plc
 TEST ORGANIZATION: Rolls-Royce plc
 TEST LOCATION: Hucknall
 TEST DATES: 01/05/1999

REMARKS

1. Data from certification report DNS63281.
2. Phase 5 combustor

Compliance with Fuel Venting requirements: -

('x' if complies, 'PR' if pre-regulation, '-' if information is not available)